

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

- 1 1 (currently amended): A method of making a proton exchange fuel cell
2 electrode, comprising:
 - 3 forming carbon nanotubes on a substrate, to form a catalyst support;
 - 4 depositing a precious metal on the nanotubes, to form a carbon nanotube
5 supported catalyst; and
 - 6 incorporating a polymer membrane into the spaces between the carbon nanotube
7 supported catalyst, to form the electrode,
 - 8 wherein said forming comprises directly growing carbon nanotubes on a carbon
 - 9 substrate using a chemical vapor deposition process, and said forming comprises depositing a
 - 10 catalyst selected from the group consisting of cobalt, iron, boron, and combinations thereof, on
 - 11 the carbon substrate, for catalyzing the growing of the carbon nanotubes, and wherein said
 - 12 depositing cobalt comprises electrodepositing on one side of the carbon substrate by a three-
 - 13 electrode dc method in a 5 wt. % CoSO₄ and 2 wt. % H₃BO₃ aqueous solution at 20°C.
- 1 2 (original): The method of claim 1 wherein said forming comprises forming
2 carbon nanotubes on a gas diffusion layer substrate.
- 1 3 (original): The method of claim 1 wherein said forming comprises forming
2 single walled carbon nanotubes.
- 1 4 (original): The method of claim 1 wherein said forming comprises forming
2 multi-walled carbon nanotubes.

1 5 (original): The method of claim 1 wherein said forming comprises preparing
2 an array of anodic porous alumina templates on a substrate before said forming, to form an
3 aligned array of carbon nanotubes.

1 6 (original): The method of claim 5 comprising preparing an array of anodic
2 porous alumina templates on a porous silicon substrate before said forming, to form an aligned
3 array of carbon nanotubes.

1 7 (original): The method of claim 1 wherein said forming comprises growing
2 carbon nanotubes on the substrate using a chemical vapor deposition process using acetylene in
3 nitrogen as a carbon source.

1 8 (original): The method of claim 7 wherein said forming comprises growing
2 boron dopes carbon nanotubes on the substrate using a chemical vapor deposition process using
3 acetylene in nitrogen as a carbon source.

1 9-11 (canceled)

1 12 (currently amended): The method of claim 4-1 wherein the cobalt loading is
2 between none and 20 mg/m².

1 13 (original): The method of claim 12 wherein the size of the deposited catalyst
2 particles is a function of the catalyst loading, such that an increase in catalyst loading produces
3 larger cobalt particles.

1 14 (canceled)

1 15 (original): The method of claim 1 wherein said depositing comprises
2 depositing a metal selected from the group consisting of platinum, gold, other precious metals,
3 and combinations thereof.

1 16 (original): The method of claim 1 wherein said depositing comprises surface
2 functionalizing the surface of the nanotubes through a chemical oxidation treatment and
3 depositing the precious metal by an incipient-wetness process.

1 17 (canceled)

1 18 (currently amended): A method of making a proton exchange fuel cell
2 electrode, comprising:
3 forming carbon nanotubes on a substrate, to form a catalyst support;
4 depositing a precious metal on the nanotubes, to form a carbon nanotube
5 supported catalyst; and
6 incorporating a polymer membrane into the spaces between the carbon nanotube
7 supported catalyst, to form the electrode,
8 wherein said depositing comprises an electrodeposition process, and
9 The method of claim 17 wherein the electrodeposition process comprises
10 electrodepositing platinum on the nanotubes by a three-electrode dc method in 5 mM H₂PtCl₆
11 and 0.5 M H₂SO₄ aqueous solution.

1 19 (original): The method of claim 1 wherein said incorporating a polymer
2 membrane comprises depositing a solubilized perfluorosulfonate ionomer into the spare space
3 between nanotubes to form a 4-phase boundary.

1 20 (original): The method of claim 1 further comprising forming a proton
2 exchange membrane fuel cell utilizing the formed electrode, comprising:
3 adding a proton conducting membrane; and
4 adding electron collectors having fuel flow fields, to form the proton exchange
5 membrane fuel cell.